The microbial opsin family of optogenetic tools.

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Public Summary:

Scientific Abstract:
The capture and utilization of light is an exquisitely evolved process. The single-component microbial opsins, although more limited than multicomponent cascades in processing, display unparalleled compactness and speed. Recent advances in understanding microbial opsins have been driven by molecular engineering for optogenetics and by comparative genomics. Here we provide a Primer on these light-activated ion channels and pumps, describe a group of opsins bridging prior categories, and explore the convergence of molecular engineering and genomic discovery for the utilization and understanding of these remarkable molecular machines.